

DrugBank



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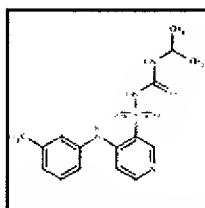
for All

drugs

Identification

Name	Torasemide
Accession Number	DB00214 (APRD00217, APRD00295)
Type	small molecule
Groups	approved
Description	Torasemide (rINN) or torsemide (USAN) is a pyridine-sulfonylurea type loop diuretic mainly used in the management of edema associated with congestive heart failure. It is also used at low doses for the management of hypertension. It is marketed under the brand name Demadex. [Wikipedia]

Structure



Download: [MOL](#) | [SDF](#) | [SMILES](#) | [InChI](#)

Display: [2D Structure](#) | [3D Structure](#)

Synonyms

- Torasemida [INN-Spanish]
- Torasemidum [INN-Latin]
- Torsemide

Brand names

- Demadex
- Luprac

Brand name mixtures

Not Available

Categories

- Antihypertensive Agents
- Diuretics

CAS number

56211-40-6

Weight

Average: 348.42

Monoisotopic: 348.125611216

InChI Key

InChIKey=NGBFQHCMQULJNZ-UHFFFAOYSA-N

InChI

InChI=1S/C16H20N4O3S/c1-11(2)18-16(21)20-24(22,23)15-10-17-8-7-14(15)19-13-6-4-5-12(3)9-13/h4-11H,1-3H3,(H,17,19)(H2,18,20,21)

[Plain Text](#)

IUPAC Name

1-{{4-[(3-methylphenyl)amino]pyridine-3-sulfonyl}}-3-(propan-2-yl)urea

SMILES

CC(C)NC(=O)NS(=O)(=O)C1=C(NC2=CC(C)=CC=C2)C=CN=C1

[Plain Text](#)

Mass Spec

Not Available

Taxonomy

Kingdom

Organic

Classes

- Sulfonylureas
- Sulfonylureas
- Aliphatic and Aryl Amines
- Pyridines and Derivatives
- Sulfonyls

Substructures

- Benzene and Derivatives
- Ureas and Derivatives
- Aminopyridines and Derivatives
- Heterocyclic compounds
- Aromatic compounds
- Sulfonamides
- Anilines

Pharmacology

Indication

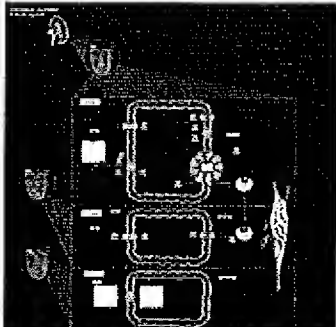
For the treatment of edema associated with congestive heart failure, renal disease, or hepatic disease. Also for the treatment of hypertension alone or in combination with other antihypertensive agents.

Pharmacodynamics

Torasemide (INN) or torsemide (USAN) is a novel loop diuretic belonging to pyridine sulphonyl urea. It differs from other thiazide diuretics in that a double ring system is incorporated into its structure. Like thiazides, loop diuretics must be secreted into the tubular fluid by proximal tubule cells. In the thick ascending loop Na^+ and Cl^- reabsorption is accomplished by a $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ symporter. The thick ascending limb has a high reabsorptive capacity and is responsible for reabsorbing 25% of the filtered load of Na^+ . The loop diuretics act by blocking this symporter. Because of the large absorptive capacity and the amount of Na^+ delivered to the ascending limb, loop diuretics have a profound diuretic action. In addition, more distal nephron segments do not have the reabsorptive capacity to compensate for this increased load. The osmotic gradient for water reabsorption is also reduced resulting in an increase in the amount of water excreted.

Torasemide inhibits the $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ -carrier system (via interference of the chloride binding site) in the

Mechanism of action	lumen of the thick ascending portion of the loop of Henle, resulting in a decrease in reabsorption of sodium and chloride. This results in an increase in the rate of delivery of tubular fluid and electrolytes to the distal sites of hydrogen and potassium ion secretion, while plasma volume contraction increases aldosterone production. The increased delivery and high aldosterone levels promote sodium reabsorption at the distal tubules, and By increasing the delivery of sodium to the distal renal tubule, torasemide indirectly increases potassium excretion via the sodium-potassium exchange mechanism. Torasemide's effects in other segments of the nephron have not been demonstrated. Thus torasemide increases the urinary excretion of sodium, chloride, and water, but it does not significantly alter glomerular filtration rate, renal plasma flow, or acid-base balance. Torasemide's effects as an antihypertensive are due to its diuretic actions. By reducing extracellular and plasma fluid volume, blood pressure is reduced temporarily, and cardiac output also decreases.				
Absorption	Rapidly absorbed following oral administration. Absolute bioavailability is 80%. Food has no effect on absorption.				
Volume of distribution	<ul style="list-style-type: none">12 to 15 L [normal adults or in patients with mild to moderate renal failure or congestive heart failure]				
Protein binding	> 99%				
Metabolism	Metabolized via the hepatic CYP2C8 to 5 metabolites. The major metabolite, M5, is pharmacologically inactive. There are 2 minor metabolites, M1, possessing one-tenth the activity of torasemide, and M3, equal in activity to torasemide. Overall, torasemide appears to account for 80% of the total diuretic activity, while metabolites M1 and M3 account for 9% and 11%, respectively.				
	Enzyme	Metabolite	Reaction	K_m	V_{max}
	<u>Prostaglandin G/H synthase 1</u>		hydroxylation		
	<u>Cytochrome P450 2C9</u>		methyl-hydroxylation		
	<u>Cytochrome P450 2C9</u>	hydroxytorasemide	tolylmethylhydroxylation	11.9	136.61
	<u>Cytochrome P450 2C8</u>	hydroxytorasemide	tolylmethylhydroxylation	147	32.22
Route of elimination	Torsemide is cleared from the circulation by both hepatic metabolism (approximately 80% of total clearance) and excretion into the urine (approximately 20% of total clearance in patients with normal renal function).				
Half life	3.5 hours				
Clearance	Not Available				
Toxicity	Symptoms of overdose include dehydration, hypovolemia, hypotension, hyponatremia, hypokalemia, hypochloremic alkalosis, and hemoconcentration. Oral LD ₅₀ in rat is 5 g/kg, and intravenous LD ₅₀ in rat is 500 mg/kg.				
Affected organisms	<ul style="list-style-type: none">Humans and other mammals				

Pathway	Name	SMPDB ID
	Torsemide Pathway	SMP00118

Pharmacoeconomics

Manufacturers	<ul style="list-style-type: none"> Hoffmann la roche inc Bedford laboratories Luitpold pharmaceuticals inc Meda pharmaceuticals inc Apotex inc etobicoke site Aurobindo pharma ltd Hetero drugs ltd Par pharmaceutical inc
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Packagers	<ul style="list-style-type: none"> • Pliva pharmaceutical industry inc • Roxane laboratories inc • Sun pharmaceutical industries ltd • Teva pharmaceuticals usa inc • <u>American Regent</u> • <u>Apotex Inc.</u> • <u>Aurobindo Pharma Ltd.</u> • <u>Camber Pharmaceuticals Inc.</u> • <u>Cardinal Health</u> • <u>Diversified Healthcare Services Inc.</u> • <u>F Hoffmann-La Roche Ltd.</u> • <u>General Injectables and Vaccines Inc.</u> • <u>Greenstone LLC</u> • Heartland Repack Services LLC • <u>Hetero Drugs Ltd.</u> • Ivax Pharmaceuticals • <u>Mckesson Corp.</u> • <u>Meda AB</u> • <u>Murfreesboro Pharmaceutical Nursing Supply</u> • Neuman Distributors Inc. • <u>Palmetto Pharmaceuticals Inc.</u> • <u>Par Pharmaceuticals</u> • <u>Physicians Total Care Inc.</u> • <u>Pliva Inc.</u> • <u>Preferred Pharmaceuticals Inc.</u> • <u>Prepak Systems Inc.</u> • Resource Optimization and Innovation LLC • <u>Roxane Labs</u> • <u>Sun Pharmaceutical Industries Ltd.</u> • <u>Teva Pharmaceutical Industries Ltd.</u> • <u>UDL Laboratories</u> • Vanguard Labs Inc.

	Form	Route	Strength
Dosage forms	Injection, solution	Intravenous	
	Tablet	Oral	

	Unit description	Cost	Unit
Prices	Demadex 100 mg tablet	5.69 USD	tablet
	Torsemide 100 mg tablet	3.16 USD	tablet
	Demadex 20 mg tablet	1.59 USD	tablet
	Demadex 10 mg tablet	1.39 USD	tablet
	Demadex 5 mg tablet	1.28 USD	tablet
	Torsemide 20 mg tablet	0.85 USD	tablet
	Torsemide 10 mg tablet	0.73 USD	tablet
	Torsemide 5 mg tablet	0.66 USD	tablet

Patents Not Available

	Properties
State	solid
→ Melting point	164-164 °C ←

	Property	Value	Source
Experimental Properties	water solubility	Water soluble	<u>PhysProp</u>
	logP	2.3	<u>PhysProp</u>
	pKa	7.1	Various sources
	Property	Value	Source
	water solubility	5.96e-02 g/l	<u>ALOGPS</u>